

What is claimed is:

1. A semiconductor device manufacturing method using a film forming apparatus having a film forming chamber for performing a film forming process to a semiconductor substrate, the film forming apparatus performing said film forming process at a first temperature, and including a step of forming a first thin film over said semiconductor substrate, the method comprising the steps of:

after forming said first thin film over a predetermined number of said semiconductor substrates,

(a) decreasing a temperature in said film forming chamber up to a second temperature lower than said first temperature;

(b) after said step (a), forming a plasma from a gas containing a halogen system gas, and removing an accretion attached in said film forming chamber by using said plasma; and

(c) after said step (b), cleaning an interior of said film forming chamber in a step of raising the interior of said film forming chamber up to said first temperature,

wherein said film forming apparatus has, in said film forming chamber, a first member reacting with a halogen system element and generating a by-product, and

the method further comprises the step of:

forming a second thin film on an inner wall of said film forming apparatus and on a surface of a member provided in said film forming chamber at the same

temperature as that after said accretion is removed in said step (b) or at a temperature before the interior of said film forming chamber reaches said first temperature in said step (c).

2. The semiconductor device manufacturing method according to claim 1,

wherein said first member contains a metal element or silicon.

3. The semiconductor device manufacturing method according to claim 1,

wherein said first temperature is 600°C or higher, and said second temperature is a temperature at which no reaction of said halogen system element and said first element occurs.

4. The semiconductor device manufacturing method according to claim 3,

wherein said second temperature is 500°C or lower.

5. The semiconductor device manufacturing method according to claim 1,

wherein said first and second thin films contain silicon.

6. The semiconductor device manufacturing method according to claim 5,

wherein said second thin film includes a thin film of the same type as that of said first thin film.

7. The semiconductor device manufacturing method according to claim 1,

wherein said film forming apparatus performs the film forming process by a chemical film forming method.

8. The semiconductor device manufacturing method according to claim 1,

wherein said semiconductor substrate has a diameter of 300 mm or larger.

9. A film forming method using a film forming apparatus having a film forming chamber for performing a film forming process to a substrate, the film forming apparatus performing said film forming process at a first temperature, and forming a thin film over said substrate, the method comprising the steps of:

after forming said first thin film over a predetermined number of said substrates,

(a) decreasing a temperature in said film forming chamber up to a second temperature lower than said first temperature;

(b) after said step (a), forming a plasma from a gas containing a halogen system gas, and removing an accretion attached in said film forming chamber by said plasma; and

(c) after said step (b), cleaning an interior of said film forming chamber in a step of raising the interior of said film forming chamber up to said first temperature,

wherein said film forming apparatus has, in said film forming chamber, a first member reacting with a halogen system element and generating a by-product, and

the method further comprises the step of:

forming a second thin film on an inner wall of said film forming apparatus and on a surface of a member provided in said film forming chamber at the same temperature as that after said accretion is removed in said step (b) or at a temperature before the interior of said film forming chamber reaches said first temperature in said step (c).

10. The film forming method according to claim 9, wherein said first member contains a metal element or silicon.

11. The film forming method according to claim 9, wherein said first temperature is 600°C or higher, and said second temperature is a temperature at which no reaction of said halogen system element and said first element occurs.

12. The film forming method according to claim 11, wherein said second temperature is 500°C or lower.

13. The film forming method according to claim 9, wherein said film forming apparatus performs the film forming process by a chemical film forming method.

14. The film forming method according to claim 9, wherein said semiconductor substrate has a diameter of 300 mm or larger.